INTERNATIONAL RESEARCH JOURNAL IN ADVANCED ENGINEERING AND TECHNOLOGY (IRJAET) E - ISSN: 2454-4752 P - ISSN : 2454-4744
VOL 3 ISSUE 1 (2017) PAGES 1575 - 1579
RECEIVED : 5/01/2017. PUBLISHED : 19.01.2017
November 19, 2016

ENERGY EFFICIENT CROSS LAYER NETWORK OPERATION MODEL FOR IEEE 802.15.4-BASED MOBILE WIRELESS SENSOR NETWORKS

[1]N.Revathi M.PhIL., [2]Mrs.K.Anbumathi M.Sc ., M.Phil.,

[1]Research Scholar, Department of Computer Science, Bharathiyar Arts and Science College for Women's, Deviyakurichi, Salem.

[2]Assistant Professor, Department of Computer Science, Bharathiyar Arts and Science College for Women's, Deviyakurichi, Salem.

Abstract

This paper introduces a cross-layer operation model that can improve the energy consumption and system throughput of IEEE 802.15.4 MWSNs. The proposed model integrates four layers in the network operation: 1) application (node location) 2) network (routing) 3) medium access control (MAC) and 4) physical layers. The position of the transportable nodes is embedded in the routing operation subsequent to the route discovery development. The location information is then utilized by the MAC layer transmission power control to normalize the transmission range of the node. This is used to minimize the influence utilized by the network interface to reduce the energy consumption of the node(s). The model employs a mechanism to reduce the national discovery broadcasts to the active routes only. Reducing control small put together broadcasts connecting the nodes reduces the network's consumed energy. It also decreases the occupation period of the wireless channel. The model operation leads the network to consume less power while maintaining the network packet delivery ratio.

1. INTRODUCTION

A wireless sensor network (WSN**)** consists of spatially distributed autonomous sensors to monitor physical or environmental conditions, such as temperature , sound , vibration , pressure , motion or pollutants and to cooperatively pass their data through the set of connections to a main location. The more contemporary networks are bi-directional enabling also to control the activity of the sensors. The development of wireless sensor networks was motivated by military applications such as battlefield surveillance; today such networks are used in many manufacturing and purchaser applications such as industrial process monitoring and control, machine health monitoring, and so on.

Clustering results in a number of benefits. It facilitates distribution of control over the network. It saves energy and reduces network contention by enabling locality of communication. Nodes communicate their data over shorter distances to their respective cluster head (CH). The cluster head aggregates these data into a smaller set of meaningful information. Not all nodes, but only the cluster heads need to exchange a few words with their neighbouring cluster heads and sink/base station.

INTERNATIONAL RESEARCH JOURNAL IN ADVANCED ENGINEERING AND TECHNOLOGY (IRJAET) E - ISSN: 2454-4752 P - ISSN : 2454-4744
VOL 3 ISSUE 1 (2017) PAGES 1575 - 1579
RECEIVED : 5/01/2017. PUBLISHED : 19.01.2017
November 19, 2016

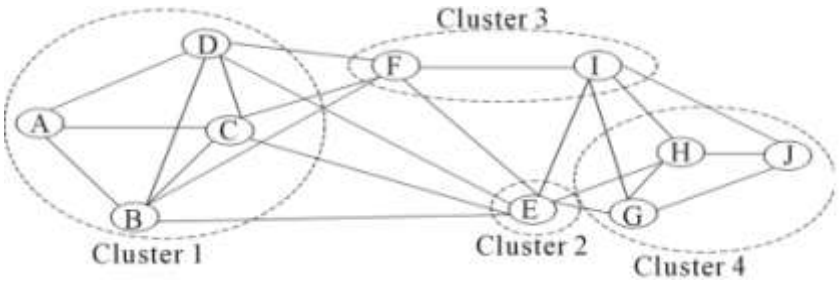

Fig 1.1 Multiple cluster

2. RELATED WORK

A clustering based routing protocol called base station controlled dynamic clustering protocol, utilizes a high energy base station o setup cluster heads and perform other energy efficient tasks and thereby increasing the lifetime of a network. A cross layer network operation mechanism which considers the physical and MAC layers to maximize the lifetime of a network. The model assumes that the problem of network is convex where G (P, h(ni)) is the network graph , P is the set of nodes deployed and h(ni) is the quantity of data needed from node i to indicate the sensed event in the consumption area. The deployed nodes are static and this model has not been tested for wireless sensor networks with mobility characteristics. Load balancing and clustering in Hybrid Sensor network with mobile Cluster Nodes [8] proposed an algorithm which works on the position of mobile cluster heads balancing of traffic load in sensor network that consist of mobile and static nodes. Low energy adaptive clustering hierarchy (LEACH) [9] is a clustering-based protocol which utilizes randomized rotation of local CHs to evenly distribute the energy consignment transversely the network. Compared with other ordinary routing protocols like DD, it can prolong the network lifetime up to 8 times. However, the 5% of CHs are randomly selected and CHs transmit data directly to SN. Reference [3] proposed an Energy Efficient and QoS aware multipath routing protocol (EQSR) has been proposed for WSNs. This protocol is mainly used to find out the best path from the multiple path from source to destination. This protocol chooses its routing path based on the physical layer elements of the next hop. Those elements are the nodes residual energy interface buffer availability and the connection signal-to-noise ratio between two neighbor nodes. This protocol is an example of the tight cross layer of information between the physical layer and the network layer. In Energy Efficient Hierarchical Clustering Algorithm, a distributed, randomized clustering algorithm is proposed. The algorithm generates hierarchy of cluster heads. It has been observed that the energy savings increases with the number of levels in the hierarchy and thereby increases the lifetime of a network. SPEED is another QoS based routing protocol that provides soft real-time end -to-end guarantees. Each sensor node maintains information about its neighbors and exploits geographic forwarding to find the paths. To ensure packet delivery within the required time limits, SPEED enables the application to compute the end-to-end delay by dividing the distance to the sink by the speed of packet delivery before making any admission decision. In addition to that, SPEED can provide congestion avoidance when the network is congested. In order to suit the periodical data gathering applications an Energy Efficient Clustering scheme [4] a novel scheme (EECS) for single-hop wireless sensor networks. This paper dealt with an approach to elect cluster heads with more residual energy in an autonomous manner using local radio communication. It produce good cluster head distribution and balances the load among cluster heads using this novel scheme.

3. PROPOSED SYSTEM

To overcome these drawbacks a new scheme is introduced a cross-layer operation model that can improve the energy consumption and system throughput of IEEE 802.15.4 MWSNs. This project proposed a simple and efficient model for the effective cross layer model for the MWSN. It based on the two mechanisms the first one is to control the packets being broad cast. The second one is transmission power control. The transmission control is only active when the route is on .The cross layer model that is not efficient in each mechanism process. The mechanism that should be implemented in each layer is important for the secure transmission. The proposed model integrates four layers in the network operation: 1) application (node location); 2) network (routing); 3) medium access control (MAC); and 4) physical layers. The location of the mobile nodes is embedded in the routing operation after the route discovery process. The location information is then utilized by the MAC layer transmission power control to adjust the transmission range of the node. This is used to minimize the power utilized by the network interface to reduce the energy consumption of the nodes. This model is further effective for the best of our knowledge.

4. SYSTEM MODEL

- Wireless Network Configure Setting
- Node Creation
- Voting Based Mechanism
- Cluster Head Election
- Qos Routing Through Gateway Node
- Graph Design Based Result

Wireless network configure setting

- Wireless Networks to create the no of nodes. The packets to send and receiving through the source to destination. It's based the scheme of packets delivered for ACK packet drop on the nodes. In this network to creating the source and destination node of the network and transmit the data to processing on their whole networking.

Topology design

- This module is developed to Topology design all node place particular distance. Without using any cables then fully wireless mobile equipment based transmission and received packet data. Node and wireless between calculate sending and receiving packets. The cluster head is at the canter of the circular sensing area. Intermediate the sender and receiver of this networking performance on this topology.

Node creation

- This module is developed to node creation and more than 30 nodes placed particular distance. Wireless node placed intermediate area. Each node knows its location relative to the sink. The access point has to receive transmit packets then send acknowledge to transmitter.

Voting based mechanism

- The voting based allows all nodes in the network to vote together. As Certification Authority (CA) exists in the network, and instead each node monitors the behavior of its neighbours. The weight of a node is calculated in terms of the reliability and trustworthiness of the node that is derived from its past behaviours, like the number of accusations against other nodes

INTERNATIONAL RESEARCH JOURNAL IN ADVANCED ENGINEERING AND TECHNOLOGY (IRJAET) E - ISSN: 2454-4752 P - ISSN : 2454-4744
VOL 3 ISSUE 1 (2017) PAGES 1575 - 1579
RECEIVED : 5/01/2017. PUBLISHED : 19.01.2017
November 19, 2016

and that against itself from others. The stronger its reliability, the greater the weight will be acquired. The certificate of an accused node is revoked when the weighted sum from voters against the node exceeds a predefined threshold.

Cluster head selection

- The fuzzy relevance clustering algorithm protocol, consider both the residual energy and the current speed of each mobile node in cluster head election in order to avoid that low-energy nodes are selected as cluster heads and balance the energy consumption among all nodes. After a cluster head is selected, it broadcasts an advertisement message as well as its location, velocity to the mobile nodes within its transmission range using a carrier sense multiple access with collision avoidance (CSMA/CA) media access control (MAC) protocol. Each nodes in the cluster have a cluster id and node id for its authentication process.

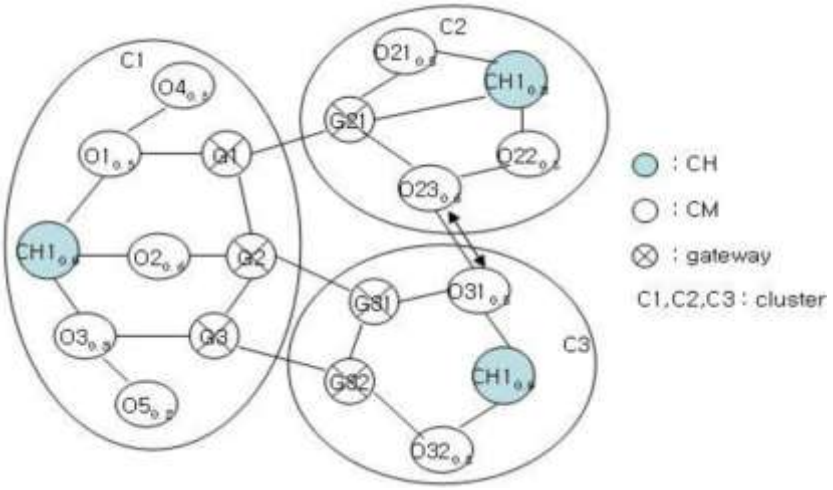

Fig 1.2 Cluster Head Selection Node

Qos routing through gateway node

- If the source and destination are in different clusters then the data from source is transmitted to destination of other cluster through the gate way nodes present in the intermediate cluster. The local cluster gateway node that has the shortest distance to the external network node includes that external node in its control message. Due to the FSR mechanics, the gateway node closest to the external network node will be the first gateway to receive the external node's link state update. It is responsible for providing this information to the cluster.

Graph design based result

- Graph is an essential part of display a result, so we plot a graph to show a various result comparison with packets, throughput, energy efficient and etc.

CONCLUSION

The proposed method is simple, intuitive yet highly effective cross-layer network operational model for MWSNs. The proposed model integrates four layers in the network operation: 1) application (node location), 2) network (routing), 3) medium access control (MAC), and 4) physical layers. The location of the mobile nodes is embedded in the routing operation after the route discovery process. The network model employs two major mechanisms: the first is controlling the amount of control packets being broadcast in the network to provide a relief for the communication channel

between the nodes. The control packet minimization process focuses on the broadcast packets, mainly neighbor, discovery mechanism at the MAC layer and the neighbor discovery packets (hello packets) at the routing layer. The second mechanism is transmission power control that is dependent on the node'(s') location. The transmission power control mechanism is only active when the route is established; therefore, its effect is guaranteed at the data transmission state. Combined together results in energy efficiency, higher throughput and lower end-to-end delays than the standard model.

REFERENCES

[1] M. Cattani, S. Guna, and G. P. Picco, "Group monitoring in mobile wireless sensor networks," in *2011 International Conference on Distributed Computing in Sensor Systems and Workshops (DCOSS)*, 2011, pp. 1–8.

[2] K. Zen, D. Habibi, A. Rassau, and I. Ahmad, "Performance evaluation of IEEE 802.15.4 for mobile sensor networks," in *5th IFIP International Conference on Wireless and Optical Communications Networks, 2008. WOCN '08*, 2008, pp. 1–5.

[3] X. Wang, X. Lin, Q. Wang, and W. Luan, "Mobility Increases the Connectivity of Wireless Networks," *Ieeeacm Trans. Netw.*, vol. 21, no. 2, pp. 440–454, Apr. 2013.

[4] S. A. B. Awwad, C. K. Ng, N. K. Noordin, and M. F. A. Rasid, "Cluster Based Routing protocol for Mobile Nodes in Wireless Sensor Network," in *International Symposium on Collaborative Technologies and Systems, 2009. CTS '09*, 2009, pp. 233–241.

[5] T. Yang, T. Oda, L. Barolli, J. Iwashige, A. Durresi, and F. Xhafa, "Investigation of Packet Loss in Mobile WSNs for AODV Protocol and Different Radio Models," in *2012 IEEE 26th International Conference on Advanced Information Networking and Applications (AINA)*, 2012, pp. 709–715.